WHAT IS CLAIMED IS::

1. A feedback compensating apparatus for a working system including (a) a working machine for performing a working operation on each of at least one working portion of each of a plurality of workpieces, to process said each working portion as desired, such that working operations on said plurality of the workpieces take place successively one after another, (b) machine control means for determining a working condition of said working machine on the basis of an extraneous signal, and controlling said working machine according to the determined working condition, and (c) a measuring device for measuring actual dimensions of the working portions of the workpieces processed or under processing by said working machine, said feedback compensating apparatus being used with said machine control means and said measuring device, said apparatus comprising:

data obtaining means for obtaining dimensional data on the basis of outputs of said measuring device during at least one of a first period and a second period following said first period, said working operation on said each working portion being performed during said first period, said dimensional data including a dimensional error of the working portions of the workpieces, and a variable indicative of a tendency of change in said dimensional error of the workpieces; and

compensating means for determining a compensating signal as said extraneous signal on the basis of said dimensional data, and applying said compensating signal to said machine control means, to adjust said working condition of said working machine.

2. A feedback compensating apparatus according to claim 1, wherein said plurality of workpieces consist of a plurality of cylinder blocks for an engine of a motor vehicle, and said at least one working portion consists of at least one cylinder bore formed in each of said cylinder blocks, said working machine consisting of a honing machine for honing an inner cylindrical surface of each of said at least one cylinder bore.

3. A feedback compensating apparatus according to claim 1, wherein said plurality of workpieces consist of a plurality of crankshafts for an engine of a motor vehicle, and said at least one working portion consists of at least one journal formed on each of said crankshafts, said working machine consisting of a cylindrical grinding machine for grinding an outer cylindrical surface of each of said at least one journal.

4. A feedback compensating apparatus according to claim 1, wherein said measuring device includes a post-process measuring device for measuring the actual

dimensions of the processed working portions of the workpieces during said second period , and said working system further includes an in-process measuring device for measuring the actual dimensions of the working portions during said first period, and wherein said data obtaining means obtains as said dimensional error differences between the actual dimensions of said processed working portions measured by said post-process measuring device and a nominal value of said working portions, said data obtaining means further obtaining as said variable a variable indicative of a tendency of change in said differences, said compensating means determining said compensating signal on the basis of said differences and said variable indicative of said tendency of change in said differences, and applying said compensating signal to said machine control means so as to adjust a reference value which is set in said machine control means as said working condition, so that an output of said in-process measuring device is compared with said reference value as adjusted according to said compensating signal.

5. A feedback compensating apparatus according to claim 1, wherein said compensating means comprises fuzzy inference means for effecting fuzzy inference to obtain a fuzzy inference value, on the basis of said dimensional data, said fuzzy inference value affecting said compensating signal.

6. A feedback compensating apparatus according to claim 1, wherein said compensating means determines said compensating signal in the form of a compensating value representative of an amount of adjustment of said working condition, such that said compensating value is changed toward zero, when said dimensional error and said variable indicative of said tendency of change obtained by said data obtaining means are larger than respective threshold values.

7. A feedback compensating apparatus according to claim 1, wherein said compensating means determines said compensating signal in the form of successive compensating values representative of respective amounts of adjustment of said working condition, on the basis of said dimensional data on the working portions successively processed by said machine, said compensating means comprising determining means for determining said successive compensating values such that a present one of said successive compensating values is determined on the basis of said dimensional data currently obtained by said data obtaining means, and at least one preceding compensating value of said successive compensating values which precedes said present one compensating value.

8. A feedback compensating apparatus according to claim 7, wherein said determining means determines a present provisional compensating value as said

present one of said successive compensating values on the basis of said dimensional error and said variable indicative of said tendency of change in said dimensional error, and adjusts said present provisional compensating value into a present final compensating value such that said present final compensating value lies on a line which is determined by said present provisional compensating value and a plurality of preceding provisional compensating values which precede said present provisional compensating value, said line assuring a gradual change in said amounts of adjustment of said working condition.

9. A feedback compensating apparatus according to claim 1, wherein said data obtaining means obtains on the basis of said outputs of said measuring device, said dimensional error, a first variable indicative of said tendency of change in said dimensional error, and a second variable indicative of a tendency of change in said first variable, during at least one of said first and second periods.

10. A method of processing at least one working portion provided on each of a plurality of workpieces, such that said workpieces are successively processed one after another by a working machine, comprising the steps of:

obtaining dimensional data including a dimensional error of the processed working portions of the workpieces, and a variable indicative of a tendency of change in said dimensional error of the workpieces, during at least one of a first period during which a working operation on each of said at least one working portion is performed and a second period following said first period; and

feeding back said dimensional data to said working machine, to adjust a working condition of said machine on the basis of said dimensional data, for subsequent working operation on the working portions of the workpieces according to the adjusted working condition.

11. A feedback compensating apparatus according to claim 1, wherein said data obtaining means obtains a present value of an estimated dimension of the working portions of the workpieces on the basis of a predetermined first number of successive measured values represented by the outputs of the measuring device, said data obtaining means further obtaining a present dimensional error value which is a difference of said present value of said estimated dimension from a nominal dimension (Ao) of the working portion of each workpiece, said data obtaining means further obtaining a present value of said variable, on the basis of a predetermined second number of successive dimensional error values which includes said present dimensional error value, and wherein said data obtaining

means including at least one of dimension estimating means and variable obtaining means, said dimension estimating means obtaining said present value of said estimated dimension in a standard manner when the number of the successive measured values currently available is not smaller than said predetermined first number, and in a special manner different from said standard manner, when the number of said successive measured values currently available is smaller than said predetermined first number, said variable obtaining means obtaining said present value of said variable in a standard manner when the number of the successive dimensional error values currently available is not smaller than said predetermined second number, and in a special manner different from said standard manner for said variable, when the number of said successive dimensional error values currently available is smaller than said predetermined second number.

12. A feedback compensating apparatus according to claim 1, wherein said each workpiece has a plurality of working portions in the form of a plurality of coaxial outer cylindrical surfaces arranged in an axial direction thereof, said working machine including an array of working tools which correspond to said plurality of working portions, respectively, said array of working tools being moved relative to said each workpiece to simultaneously process said working portions, and wherein

said measuring device includes an in-process measuring device and a post-process measuring device, said in-process measuring device having two in-process measuring heads for measuring diameter values of respective two end working portions of said plurality of working portions, during a working operation of said machine on said each workpiece, said two end working portions being located near opposite axial ends of said each workpiece, said post-process measuring device measuring diameter values of said plurality of working portions, respectively, after said each workpiece is processed by said machine such that an operating angle of said array of working tools relative to said each workpiece is adjusted and said working operation of the machine on said each workpiece is terminated, on the basis of said diameter values of said two end working portions measured by said in-process measuring heads, in relation to two reference values set for said two end working portions, respectively, said feedback compensating apparatus further comprising:

determining means for determining two compensating values for adjusting said two reference values, on the basis of said diameter values of all of said plurality of working portions of said each workpiece measured by said post-process measuring device; and

applying means for applying said two compensating values to said machine control means.

13. A feedback compensating apparatus according to claim 1, wherein said machine performs the working operations successively on said plurality of workpieces of at least one kind, and said measuring device includes a post-process measuring device for measuring the actual dimensions of the working portions of the workpieces which have been processed by said machine, and wherein said data obtaining means obtains a set of dimensional data for each of said at least one kind of the workpieces, said apparatus further comprising:

number data obtaining means for obtaining the number of pre-measured workpieces of each of said at least one kind which have been processed by said machine and which have not been measured by said post-process measuring device,

said compensating means determining as said extraneous signal a compensating value for said each kind of the workpieces, on the basis of said set of dimensional data and said number of said pre-measured workpieces of the corresponding kind which have been obtained by said data obtaining means and said number data obtaining means, respectively, said compensating means applying said compensating value to said machine control means.

14. A feedback compensating apparatus according to claim 1, wherein said measuring device

successively measures the workpieces processed by said working machine, wherein said compensating means includes:

determining means for determining as said extraneous signal a compensating value for adjusting said working condition of machine (110), on the basis of said dimensional data obtained by said data obtaining means, said determining means updating said compensating value from time to time on an intermittent basis while said workpieces processed by said machine are measured successively by said measuring device; and

applying means for applying said compensating value to said machine control means.

15. A feedback compensating apparatus according to claim 1, wherein said compensating means includes:

determining means for determining as said extraneous signal a compensating value for adjusting said working condition of said machine (110) for the workpieces to be processed subsequently by said machine, on the basis of the actual dimensions of the working portion of the workpieces which have been measured by said measuring device, and according to a compensation rule which changes with a change in a vibration level of measured values of said actual dimensions obtained by said measuring device; and

applying means for applying said compensating value to said machine control means.

16. A feedback compensating apparatus according to claim 1, wherein said compensating means applies said compensating value to said machine control means to adjust said working condition of said machine when said compensating value is outside a predetermined tolerable range, and inhibits the application of said compensating value to said machine control means when said compensating value falls within said tolerable range.

17. A feedback compensating apparatus according to claim 1, further comprising manual compensating means for effecting an manual adjustment of said working condition of said machine, said manual compensating means determining also as said extraneous signal a manual compensating value to adjust said working condition of said machine, in response to manual compensating data entered by an operator of said machine, said manual compensating means applying said manual compensating value to said machine control means, and wherein said compensating means functions as automatic compensating means for effecting an automatic adjustment of said working condition, said automatic compensating means determining as said compensating signal an automatic compensating value for adjusting said working condition of said machine for the workpieces to be processed

subsequently by said machine, on the basis of said dimensional data obtained by said data obtaining means, said automatic compensating means applying said automatic compensating value to said machine control means,

said automatic compensating means interrupting an operation to effect said automatic adjustment when said manual adjustment by said manual compensating means is started, and resuming said operation to effect said automatic adjustment, at a moment not earlier than a moment when a first one of the workpieces processed by said machine under the working condition adjusted by said manual compensating value has been measured by said measuring device.

18. A feedback compensating apparatus for a working system including (a) a working machine for successively processing a plurality of workpieces, (b) machine control means for determining a working condition of said working machine on the basis of an extraneous signal, and controlling said working machine according to the determined working condition, and (c) a measuring device for measuring actual dimensions of working portions of the workpieces processed by said working machine, said feedback compensating apparatus being used with said machine control means and said measuring device, said apparatus comprising:

data obtaining means for obtaining dimensional data on the basis of outputs of said measuring device, said

dimensional data including a dimensional error of the processed workpieces, and a variable indicative of a tendency of change in said dimensional error of the workpieces, said data obtaining means obtaining a present value of an estimated dimension of the working portions of the workpieces on the basis of a predetermined first number of successive measured values represented by the outputs of said measuring device, when each of the workpieces is measured by the measuring device, said predetermined number of successive measured values consisting of a currently measured value currently obtained by said measuring device and at least one measured value which precedes said currently measured value;

said data obtaining means obtaining a present dimensional error value which is a difference of said present value of said estimated dimension from a nominal dimension of the working portion of said each workpiece, said data obtaining means obtaining a present value of said variable, on the basis of a predetermined second number of successive dimensional error values, when said present dimensional error value is obtained, said predetermined number of successive dimensional error values consisting of said present dimensional error value and at least one error value which precedes said present dimensional error value;

said data obtaining means including at least one of dimension estimating means and variable obtaining means, said dimension estimating means obtaining said present value

of said estimated dimension in a standard manner when the number of the successive measured values currently available is not smaller than said predetermined first number, and in a special manner different from said standard manner, when the number of said successive measured values currently available is smaller than said predetermined first number, said variable obtaining means obtaining said present value of said variable in a standard manner when the number of the successive dimensional error values currently available is not smaller than said predetermined second number, and in a special manner different from said standard manner for said variable, when the number of said successive dimensional error values currently available is smaller than said predetermined second number; and

compensating means for determining a compensating signal as said extraneous signal on the basis of said present value of said estimated dimension and said present value of said variable, and applying said compensating signal to said machine control means, to adjust said working condition of said working machine.

19. A feedback compensating apparatus according to claim 18, wherein said dimension estimating means obtains said present value of said estimated dimension by inserting said predetermined first number of successive measured values into a predetermined equation, when the number of said successive measured values currently

available is not smaller than said predetermined first number, said dimension estimating means substituting said currently measured value for said present value of said estimated dimension, when said successive measured values currently available is smaller than said predetermined first number.

20. A feedback compensating apparatus according to claim 18, wherein said dimension estimating means obtains said present value of said estimated dimension by inserting said predetermined first number of successive measured values into a predetermined standard equation, when the number of said successive measured values currently available is not smaller than said predetermined first number, said dimension estimating means obtaining said present value of said estimated dimension by inserting successive measured values currently available whose number is smaller than said predetermined number, into an appropriate one of special equations which correspond to respective numbers smaller than said predetermined first number, when the number of said successive measured values currently available is smaller than said predetermined first number.

21. A feedback compensating apparatus according to claim 18, wherein said variable obtaining means obtains said present value of said variable by inserting

said predetermined second number of successive dimensional error values into a predetermined standard equation, when the number of said successive dimensional error values currently available is not smaller than said predetermined second number, said variable obtaining means obtaining said present value of said variable by inserting successive dimensional error values currently available whose number is smaller than said predetermined number, into an appropriate one of special equations which correspond to respective numbers smaller than said predetermined second number, when the number of said successive dimensional error values currently available is smaller than said predetermined second number.

22. A method of processing a plurality of workpieces by a working system including (a) a working machine for successively processing said plurality of workpieces, (b) machine control means for determining a working condition of said working machine on the basis of an extraneous signal, and controlling said working machine according to the determined working condition, and (c) a measuring device for measuring actual dimensions of working portions of the workpieces processed by said working machine, said method by comprising:

a step of obtaining dimensional data on the basis of outputs of said measuring device, said dimensional data including a dimensional error of the processed workpieces,

and a variable indicative of a tendency of change in said dimensional error of the workpieces, said step of obtaining dimensional data including the sub-steps of (a) obtaining a present value of an estimated dimension of the working portions of the workpieces on the basis of a predetermined first number of successive measured values represented by the outputs of said measuring device, when each of the workpieces is measured by the measuring device, said predetermined number of successive measured values consisting of a currently measured value currently obtained by said measuring device and at least one measured value which precedes said currently measured value, (b) obtaining a present dimensional error value which is a difference of said present value of said estimated dimension from a nominal dimension of the working portion of said each workpiece, and (c) obtaining a present value of said variable, on the basis of a predetermined second number (L) of successive dimensional error values, when said present dimensional error value is obtained, said predetermined number of successive dimensional error values consisting of said present dimensional error value and at least one error value which precedes said present dimensional error value; and

a step of determining a compensating signal as said extraneous signal on the basis of said present value of said estimated dimension and said present value of said variable, and applying said compensating signal to said

machine control means, to adjust said working condition of said working machine,

and wherein said step of obtaining dimensional data is characterized by comprising at least one of two features (d) and (e), said feature (d) consisting in obtaining said present value of said estimated dimension in a standard manner when the number of the successive measured values currently available is not smaller than said predetermined first number, and in a special manner different from said standard manner, when the number of said successive measured values currently available is smaller than said predetermined first number, said feature (e) consisting in obtaining said present value of said variable in a standard manner when the number of the successive dimensional error values currently available is not smaller than said predetermined second number, and in a special manner different from said standard manner for said variable, when the number of said successive dimensional error values currently available is smaller than said predetermined second number.

23. A feedback compensating apparatus for a working system including (a) a working machine for successively processing a plurality of workpieces one after another, each of said workpieces having a plurality of working portions in the form of a plurality of coaxial outer cylindrical surfaces arranged in an axial direction thereof,

said working machine including an array of working tools which correspond to said plurality of working portions, respectively, said array of working tools being moved relative to said each workpiece to simultaneously process said working portions, (b) an in-process measuring device having two in-process measuring heads for measuring diameter values of respective two end working portions of said plurality of working portions, during a working operation of said machine on said each workpiece, said two end working portions being located near opposite axial ends of said each workpiece, (c) a post-process measuring device (116) for measuring diameter values of said plurality of working portions, respectively, after said each workpiece is processed by said machine, and (d) machine control means for controlling said machine such that an operating angle of said array of working tools relative to said each workpiece is adjusted and said working operation of the machine on said each workpiece is terminated, on the basis of said diameter values of said two end working portions measured by said in-process measuring heads, in relation to two reference values set for said two end working portions, respectively, said feedback compensating apparatus being used with said post-process measuring device and said machine control means, said apparatus comprising:

determining means for determining two compensating values for adjusting said two reference values, on the basis of said diameter values of all of said plurality of working

portions of said each workpiece measured by said post-process measuring device; and

applying means for applying said two compensating values to said machine control means.

24. A feedback compensating apparatus according to claim 23, wherein said determining means includes:

diameter adjusting means for adjusting the diameter values of said two end working portions of the workpiece measured by said post-process measuring device, on the basis of the diameter values of all of said plurality of working portions measured by said post-process measuring device;

data obtaining means for obtaining dimensional error data relating to a dimensional error of each of said two end working portions, on the basis of the diameter values of said two end working portions adjusted by said diameter adjusting means; and

means for determining said two compensating values for adjusting said two reference values, on the basis of said dimensional error data.

25. A method of processing a plurality of workpieces by a working system including (a) a working machine for successively processing said plurality of workpieces one after another, each of said workpieces having

a plurality of working portions in the form of a plurality of coaxial outer cylindrical surfaces arranged in an axial direction thereof, said working machine including an array of working tools which correspond to said plurality of working portions, respectively, said array of working tools being moved relative to said each workpiece to simultaneously process said working portions, (b) an in-process measuring device having two in-process measuring heads for measuring diameter values of respective two end working portions of said plurality of working portions, during a working operation of said machine on said each workpiece, said two end working portions being located near opposite axial ends of said each workpiece, (c) a post-process measuring device for measuring diameter values of said plurality of working portions, respectively, after said each workpiece is processed by said machine, and (d) machine control means for controlling said machine such that an operating angle of said array of working tools relative to said each workpiece is adjusted and said working operation of the machine on said each workpiece is terminated, on the basis of said diameter values of said two end working portions measured by said in-process measuring heads, in relation to two reference values set for said two end working portions, respectively, said method comprising the steps of:

determining two compensating values for adjusting said two reference values, on the basis of said diameter

values of all of said plurality of working portions of said each workpiece measured by said post-process measuring device and

applying for applying said two compensating values to said machine control means.

26. A feedback compensating apparatus for a working system including (a) a working machine for performing a working operation on each of at least one working portion of each of a plurality of workpieces of at least one kind, to process said each working portion as desired, such that working operations on said plurality of workpieces take place successively one after another, (b) machine control means for determining a working condition of said machine on the basis of an extraneous signal, and controlling said machine according to the determined working condition, and (c) a post-process measuring device for measuring actual dimensions of the working portions of the workpieces processed by said machine, said feedback compensating apparatus being used with said machine control means and said post-process measuring machine, said apparatus comprising:

dimensional data obtaining means for obtaining a set of dimensional error data relating to a dimensional error of the processed working portions of the workpieces, for each of said at least one kind of the workpieces, on the basis of outputs of said post-process measuring device;

number data obtaining means for obtaining the number of pre-measured workpieces of each of said at least one kind which have been processed by said machine and which have not been measured by said post-process measuring device; and

compensating means for determining as said extraneous signal a compensating value for said each kind of the workpieces, on the basis of said set of dimensional error data and said number of said pre-measured workpieces of the corresponding kind which have been obtained by said dimensional data obtaining means and said number data obtaining means, respectively, said compensating means applying said compensating value to said machine control means, to adjust said working condition of said machine for the workpieces of said each kind to be subsequently processed.

27. A feedback compensating apparatus according to claim 26, wherein said plurality of workpieces are of a single kind, and said compensating means includes memory means for storing a plurality of control rules which correspond to selected respective values of said number of said pre-measured workpieces and which define respective different relationships between said compensating value and said set of dimensional error data for said single kind of workpieces, said memory means also storing a plurality of data groups which correspond to said plurality of control

rules and which define relationships between said number of said pre-measured workpieces to be obtained by said number data obtaining means, and an optimum degree of influence of said control rules to be given on said compensating value to be determined, said compensating means determining the optimum degree of influence of each of said control rules, which optimum degree corresponds to said number of said pre-measured workpieces obtained by said number data obtaining means, said compensating means determining said compensating value based on the determined optimum degree of influence, said plurality of control rules and said dimensional error data.

28. A method of processing a plurality of workpieces by a working system including (a) a working machine for performing a working operation on each of at least one working portion of each of said workpieces of at least one kind, to process said each working portion as desired, such that working operations on said plurality of workpieces take place successively one after another, (b) machine control means for determining a working condition of said machine on the basis of an extraneous signal, and controlling said machine according to the determined working condition, and (c) a post-process measuring device for measuring actual dimensions of the working portions of the workpieces processed by said machine, said method comprising the steps of:

obtaining a set of dimensional error data relating to a dimensional error of the processed working portions of the workpieces, for each of said at least one kind of the workpieces, on the basis of outputs of said post-process measuring device;

obtaining the number of pre-measured workpieces of each of said at least one kind which have been processed by said machine and which have not been measured by said post-process measuring device;

determining as said extraneous signal a compensating value for said each kind of the workpieces, on the basis of said set of dimensional error data and said number of said pre-measured workpieces of the corresponding kind which have been obtained by said dimensional data obtaining means and said number data obtaining means, respectively; and applying said compensating value to said machine control means, to adjust said working condition of said machine for the workpieces of said each kind to be subsequently processed.

29. A feedback compensating apparatus for a working system including (a) a working machine for successively processing a plurality of workpieces, (b) machine control means for determining a working condition of said working machine on the basis of an extraneous signal, and controlling said working machine according to the determined working condition, and (c) a measuring device for

measuring actual dimensions of working portions of the workpieces processed by said working machine, said working system permitting existence between said machine and said measuring device, of at least one pre-measured workpiece which has been processed by said machine and which has not been measured by said measuring device, said feedback compensating apparatus being used with said machine control means and said measuring device, said apparatus comprising:

determining means for determining as said extraneous signal a compensating value for adjusting said working condition of said machine for the workpieces to be processed subsequently by said machine, on the basis of the actual dimensions of the working portions of the workpieces which have been measured by said measuring device, said determining means updating said compensating value from time to time on an intermittent basis while said workpieces processed by said machine are measured successively by said measuring device; and

applying means for applying said compensating value to said machine control means.

30. A feedback compensating apparatus according to claim 29, wherein said determining means updates said compensating value from a last value to a present value, and determines said present value only after a first one of the workpieces processed by said machine

under the working condition adjusted by said last value has been measured by said measuring device.

31. A feedback compensating apparatus according to claim 29, wherein said determining means includes memory means for storing measured values of said actual dimensions of the processed workpieces obtained by said measuring device, and determines a present value of said compensating value on the basis of a predetermined number of said measured values stored in said memory means, when the number of said measured values stored in said memory means has become equal to or larger than said predetermined number, said determining means clearing said memory means and resuming an operation to store therein said measured values obtained by said measuring device, after completion of determination of said present value.

32. A feedback compensating apparatus according to claim 29, wherein said determining means includes memory means for storing measured values of said actual dimensions of the processed workpieces obtained by said measuring device, and determines a present value of said compensating value on the basis of a predetermined number of said measured values stored in said memory means, when the number of said measured values stored in said memory means has become equal to or larger than said predetermined number, said determining means clearing said

memory means and resuming an operation to store therein said measured values obtained by said measuring device, after a moment when said measuring device has measured a first one of the workpieces processed by said machine under the working condition adjusted by said present value.

33. A feedback compensating apparatus according to claim 32, wherein said determining means includes memory means for storing measured values of said actual dimensions of the processed workpieces obtained by said measuring device, said determining means effects primary compensation and auxiliary compensation to update said compensating value.

said primary compensation comprising determining a primary compensating value on the basis of a predetermined first number of said measured values stored in said memory means, when the number of said measured values stored in said memory means has become equal to said predetermined first number,

said auxiliary compensation comprising continuing to store said measured values in said memory means even after completion of determination of said primary compensating value, and determining a present provisional compensating value on the basis of a predetermined second number of said measured values stored in said memory means, when each of the processed workpiece is measured by said measuring device, during a time period between a moment of

the completion of determination of said primary compensating value and a moment not later than a moment when a workpiece immediately preceding a first one of the workpieces processed by said machine under the working condition adjusted by said primary compensating value has been measured by said measuring device, said determining means determining as a final auxiliary compensating value a difference of said present provisional compensating value from a last provisional compensating value which immediately precedes said present provisional compensating value, said primary compensating value being used as said last provisional compensating values upon determination of said final auxiliary compensating value for the first time,

said determining means clearing said memory means and resuming an operation to store therein said measured values obtained by said measuring device, after a moment when said measuring device has measured said first one of the workpieces,

said applying means applying said primary compensating value and said final auxiliary compensating values to said machine control means.

34. A feedback compensating apparatus according to claim 33, wherein said determining means includes a counter for counting the number of said final auxiliary compensating values successively determined in said auxiliary compensation, said determining means

terminating said auxiliary compensation if a sum of at least a predetermined number of said final auxiliary compensating values when the counted number of the determined final auxiliary compensating values has become equal to said predetermined number, is not substantially equal to zero, and continuing said auxiliary compensation with said counter cleared, if said sum is substantially zero.

35. A feedback compensating apparatus according to claim 29, wherein said determining means includes memory means for storing measured values of said actual dimensions of the processed workpieces obtained by said measuring device, and determines a present value of said compensating value on the basis of a predetermined number of said measured values stored in said memory means, when the number of said measured values stored in said memory means has become equal to or larger than said predetermined number, said determining means clearing said memory means after completion of determination of said present value,

said determining means obtaining an estimated value of said actual dimensions of the workpieces, on the basis of said present value of said compensating value and a present one of said measured values, when each of the processed workpieces is measured by said measuring device to obtain said present one of said measured values, during a time period between a moment when said operation to store

said measured values in said memory means is resumed and a moment not later than a moment when a workpiece immediately preceding a first one of the workpieces processed by said machine under the working condition adjusted by said present value of said compensating value has been measured by said measuring device, said determining means determining said estimated value as a dimension of the workpiece which would be measured by said measuring device if said workpiece were processed under the working condition of said machine adjusted by said present value of said compensating value, said determining means storing said estimated value in said memory means as said actual dimension of said workpiece immediately preceding said first one of the workpieces, each time said estimated value is obtained during said time period.

36. A feedback compensating apparatus according to claim 29, wherein said determining means includes memory means for storing measured values of said actual dimensions of the processed workpieces obtained by said measuring device, said determining means effects primary compensation and auxiliary compensation to update said compensating value,

said primary compensation comprising determining a primary compensating value on the basis of a predetermined first number of said measured values stored in said memory means, when the number of said measured values stored in

said memory means has become equal to or larger than said predetermined first number,

said auxiliary compensation comprising continuing to store said measured values in said memory means even after completion of determination of said primary compensating value, and determining a present provisional compensating value on the basis of a predetermined second number (L) of said measured values stored in said memory means, when each of the processed workpieces is measured by said measuring device, during a time period between a moment of the completion of determination of said primary compensating value and a moment not later than a moment when a workpiece immediately preceding a first one of the workpieces processed by said machine under the working condition adjusted by said primary compensating value has been measured by said measuring device, said determining means determining as a final auxiliary compensating value a difference of said present provisional compensating value from a last provisional compensating value which immediately precedes said present provisional compensating value, said primary compensating value being used as said last provisional compensating values upon determination of said final auxiliary compensating value for the first time,

said determining means clearing said memory means after completion of said auxiliary compensation, and obtaining an estimated value of said actual dimensions of the workpieces, on the basis of said final auxiliary

compensating value and a present one of said measured values, when each of the processed workpieces is measured by said measuring device to obtain said present one of said measured values, during a time period between a moment when said operation to store said measured values in said memory means is resumed and a moment not later than a moment when a workpiece immediately preceding a first one of the workpieces processed by said machine under the working condition adjusted by said primary compensating value has been measured by said measuring device, said determining means determining said estimated value as a dimension of the workpiece which would be measured by said measuring device if said workpiece were processed under the working condition of said machine adjusted by said present value of said compensating value, said determining means storing said estimated value in said memory means each time said estimated value is obtained during said time period,

said applying means applying said primary compensating value and said final auxiliary compensating value to said machine control means.

37. A feedback compensating apparatus according to claim 36, wherein said determining means includes a counter for counting the number of said final auxiliary compensating values successively determined in said auxiliary compensation, said determining means terminating said auxiliary compensation if a sum of at least

a predetermined number of said final auxiliary compensating values when the counted number of the determined final auxiliary compensating values has become equal to said predetermined number, is not substantially equal to zero, and continuing said auxiliary compensation with said counter cleared, if said sum is substantially zero.

38. A method of processing a plurality of workpieces by a working system including (a) a working machine for successively processing the workpieces, (b) machine control means for determining a working condition of said working machine on the basis of an extraneous signal, and controlling said working machine according to the determined working condition, and (c) a measuring device for measuring actual dimensions of working portions of the workpieces processed by said working machine, said working system being adapted to permit existence between said machine and said measuring device, of at least one pre-measured workpiece which has been processed by said machine and which has not been measured by said measuring device, said method comprising the steps of:

determining as said extraneous signal a compensating value for adjusting said working condition of said machine for the workpieces to be processed subsequently by said machine, on the basis of the actual dimensions of the working portions of the workpieces which have been measured by said measuring device, said determining means

updating said compensating value from time to time on an intermittent basis while said workpieces processed by said machine are measured successively by said measuring device; and

applying said compensating value to said machine control means.

39. A feedback compensating apparatus for a working system including (a) a working machine for successively processing the workpieces, (b) machine control means for determining a working condition of said working machine on the basis of an extraneous signal, and controlling said working machine according to the determined working condition, and (c) a measuring device for measuring actual dimensions of working portions of the workpieces processed by said working machine, said feedback compensating apparatus being used with said machine control means and said measuring device, said apparatus comprising:

determining means for determining as said extraneous signal a compensating value for adjusting said working condition of said machine for the workpieces to be processed subsequently by said machine, on the basis of the actual dimensions of the working portion of the workpieces which have been measured by said measuring device, and according to a compensation rule which changes with a change in a vibration level of measured values of said actual dimensions obtained by said measuring device; and

applying means for applying said compensating value to said machine control means.

40. A feedback compensating apparatus according to claim 39, wherein said compensating means includes memory means for storing data representative of a plurality of control rules, and means for selecting as said compensation rule one of said plurality of control rules depending upon said vibration level of said measured values.

41. A feedback compensating apparatus according to claim 39, wherein said compensating means includes means for measuring said vibration level of said measured values, adjusting a predetermined compensation rule depending upon the measured vibration level, and determining said compensating value according to the adjusted compensating rule.

42. A method of processing a plurality of workpieces by a working system including (a) a working machine for successively processing the workpieces, (b) machine control means for determining a working condition of said working machine on the basis of an extraneous signal, and controlling said working machine according to the determined working condition, and (c) a measuring device for measuring actual dimensions of working portions of the

workpieces processed by said working machine, said method comprising the steps of:

determining as said extraneous signal a compensating value for adjusting said working condition of said machine for the workpieces to be processed subsequently by said machine, on the basis of the actual dimensions of the working portion of the workpieces which have been measured by said measuring device, and according to a compensation rule which changes with a change in a vibration level of measured values of said actual dimensions obtained by said measuring device; and

applying said compensating value to said machine control means.

43. A feedback compensating apparatus for a working system including (a) a working machine for performing a working operation on each of at least one working portion of each of a plurality of workpieces, to process said each working portion as desired, such that working operations on said plurality of the workpieces take place successively one after another, (b) machine control means for determining a working condition of said working machine on the basis of an extraneous signal, and controlling said working machine according to the determined working condition, and (c) a measuring device for measuring actual dimensions of the working portions of the workpieces processed or under processing by said working machine, said

feedback compensating apparatus being used with said machine control means and said measuring device, said apparatus comprising:

data obtaining means for obtaining dimensional data on the basis of outputs of said measuring device during at least one of a first period and a second period following said first period, said working operation on said each working portion being performed during said first period, said dimensional data including a dimensional error of the working portions of the workpieces; and

compensating means for determining a compensating value as said extraneous signal on the basis of said dimensional data, and effecting the adjustment of said working condition of said machine according to the determined compensating value when said compensating value is outside a predetermined tolerable range, said compensating means inhibiting the adjustment of said working condition according to said compensating value when said compensating value falls within said tolerable range.

44. A method of processing at least one working portion provided on each of a plurality of workpieces such that said workpieces are successively processed one after another by a working machine, comprising the steps of:

obtaining dimensional data including a dimensional error of the working portions of the workpieces, during at

least one of a first period and a second period following said first period, said working operation on said each working portion being performed during said first period;

determining a compensating value as said extraneous signal on the basis of said dimensional data; and

adjusting said working condition of said working machine according to said compensating value when said compensating value is outside a predetermined tolerable range, and inhibiting the adjustment of said working condition according to said compensating value when said compensating value falls within said tolerable range.

45. A feedback compensating apparatus for a working system including (a) a working machine for successively processing the workpieces, (b) machine control means for determining a working condition of said working machine on the basis of an extraneous signal, and controlling said working machine according to the determined working condition, and (c) a measuring device for measuring actual dimensions of working portions of the workpieces processed by said working machine, said feedback compensating apparatus being used with said machine control means and said measuring device, said apparatus comprising:

manual compensating means for effecting an manual adjustment of said working condition of said machine (110), said manual compensating means determining as said extraneous signal a manual compensating value to adjust said

working condition of said machine, in response to manual compensating data entered by an operator of said machine, said manual compensating means applying said manual compensating value to said machine control means; and

automatic compensating means for effecting an automatic adjustment of said working condition, said automatic compensating means determining also as said extraneous signal an automatic compensating value for adjusting said working condition of said machine for the workpieces to be processed subsequently by said machine, on the basis of the actual dimensions of the working portion of the workpieces which have been measured by said measuring device, said automatic compensating means applying said automatic compensating value to said machine control means,

said automatic compensating means interrupting an operation to effect said automatic adjustment when said manual adjustment by said manual compensating means is started, and resuming said operation to effect said automatic adjustment, at a moment not earlier than a moment when a first one of the workpieces processed by said machine under the working condition adjusted by said manual compensating value has been measured by said measuring device.

46. A feedback compensating apparatus according to claim 45, wherein said automatic compensating means includes memory means for storing the dimensions of

the processed workpieces which are successively measured by said measuring device, said automatic compensating means determining said automatic compensating value on the basis of the dimension of the workpiece measured last by said measuring device, and at least one dimension previously measured and stored in said memory means, said automatic compensating means resuming the operation to effect said automatic adjustment by storing the dimensions to be subsequently measured with said memory means cleaned, at said moment not earlier than said moment when said first one of the workpiece has been measured.